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Radiological Safety Assessments for Sipping Test on Spent Fuel of G.A. Siwabessy Reactor 30 MWt in Indonesia

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Indonesia has G.A. Siwabessy reactor (RSG-GAS) that is currently in operation. Indonesia also has Interim Storage for Spent Fuels (ISSF) that is store for Spent Fuels (SFs) of RSG-GAS 30 MWt. In the national policy on Radioactive Waste Management Strategy, SFs are categorized as High-Level Waste and are not recycled because Indonesia follows open nuclear fuel cycle. SF is a fuel element type for this Material Testing Reactor that has dimensions of 76.1 x 80.5 x 868 mm with contents 19.75 % of enriched U-235 and AlMg2 cladding 0.38 mm. After the use of the fuel element in the reactor, fission products such as noble gaseous: Kr-85m, Kr-87, Kr-88, Xe-135 and Xe-138 are generated and trapped in the matrix of the fuel element. The other fission products and Transuranic (TRU) elements may possibly leak to the environment if the isolation of the fuel cladding has a defect or crack. The fission products like Cs-137, I-133, and Sb-124 pass through the cladding by diffusion process. Currently, there are 245 SF elements remaining from the maximum storage capacity of 1448 SF elements in the ISSF. The sipping test is one of the appropriate methods to determine the integrity of SFs and to observe potential leaks of SFs cladding by detecting the existence of fission products. It has been identified that 20 SF elements releasing maximum concentration of Cs-137 = 4×10-7µCi/ml, I-133 = 5.92×10−4 µCi/ml, Sb-124 = 4.7×10−5 µCi/ml and maximum dose rate 0.22 µSv/hr were measured from the water surface test tube of the sipping test. The water pool conditions have been measured, i.e. conductivity 1.57 µS/cm, pH 5.58 - 7.14, temperature 26.76 ˚C, water level 6.31 - 6.43 m and air contamination area 0.1367 Bq/m3 and also they meet the criteria. For this reason, the results indicate that there are no leaks detected in the SFs.

Do you wish to enter the YGE SFM19 Challenge?

Country or International Organization

Indonesia

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